

TRANSISTOR AND LOGIC CIRCUIT ON THIN SILICON-ON-INSULATOR WAFERS BASED ON GATE INDUCED DRAIN LEAKAGE CURRENT

Abstract of the Disclosure

A transistor structure fabricated on thin SOI is disclosed. The transistor on
5 thin SOI has gated n⁺ and p⁺ junctions, which serve as switches turning on and off
GIDL current on the surface of the junction. GIDL current will flow into the floating
body and clamp its potential and can thus serve as an output node. The transistor can
function as an inverter. The body (either n-well or p-well) is isolated from the n⁺ or
P⁺ "GIDL switches" by a region of opposite doping type, i.e., p-base and n-base.
10 The basic building blocks of logic circuits, e.g., NAND and NOR gates, are easily
implemented with such transistors on thin SOI wafers. These new transistors on thin
SOI only need contacts and metal line connections on the V_{CC} and V_{SS}. The
connection of fan-outs (between the output and input) can be implemented by
capacitor coupling. The transistor structure and operation is useful for high-
15 performance, low-voltage, and low-power VLSI circuits on SOI wafers.

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